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Jeffrey C. Hood
MEYERTONS, HOOD, KIVLIN, KOWERT & GOETZEL
P.O. Box 398
Austin, TX 78767

EXAMINER	
WOODS, ERIC V	
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SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	02/23/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No. 10/090,489	Applicant(s) OBEROI ET AL.
	Examiner Eric Woods	Art Unit 2628

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 December 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *7-10,17-22 and 25-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *7-10,17-22 and 25-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

Applicant's arguments, pages 1-8, filed 12/06/2006, with respect to the rejections of claims 7-10, 17-22, and 25-32 have been considered but are not found to be persuasive.

The amendment filed on 12/06/2006 only recites inherent properties of the claims.

Claims 7-10, 17-22, and 25-32 remain pending.

The above claims have been extensively amended.

The rejection under 35 USC 101 of claims 7-9 does **not** stand withdrawn. Storing information does not constitute a 'tangible, concrete, and practical' result. Displaying such information does, but an intended use recitation (e.g. "storing the final image…for subsequent display") does not require a positive step that produces concrete, tangible results (e.g. displaying the image). See *Interim Guidelines for Examination of Patent Applications for Patent Subject Matter Eligibility.* OG Notice 22 November 2005. For example, section (C) sets forth that in reviewing the claims, language such as: (A) **statements of intended use** or field of use, raises a question as to the limiting effect of the language in a claim. It is clear that claim 7 is a computer-based process, and that it is software based. Therefore, it constitutes an "abstract idea" – and fails to produce a concrete result. The result remains in the memory of the computer. Note Annex II, section A(v); sections B(ii) and B(iii).

The claims are directed to blending images, and "an alpha value" is well known in the art to be the coefficient that represents the contribution of one image to the blending process (e.g. percentage transparency). Therefore, alpha values are in fact "programmable scale factors."

Next, if an alpha value is provided "with the image pixel," that would be entirely consistent with such a value being provided "for each image pixel" and would represent the same thing.

If a third stream of pixels is transferred to the accumulation buffer, clearly it will replace the image A_K which is present in the buffer already as required by step (b) by overwriting with the image A_{K+1}. This appears again to be merely a statement of intended use or desired effect, which would be inherent. By definition, an accumulation buffer (in computer graphics) only has one layer or plane[1]; it cannot store more than one layer simultaneously

Therefore, those three amendments appear to be inherent or not to change the scope of the relevant portions of the claim.

The substitution of the word "repeating" for "performing" does not change the scope of the claim, since the process still loops (e.g. repeats) for each image after the first image. Lexicographically, the two words are synonymous, but there are subtle differences. Note the rejection of those claims under 35 USC 112.

[1] Carpenter, Loren. "The A-buffer, an antialiased hidden surface method." ACM SIGGRAPH, Proc. of the 11th Annual Conf. On Comp. Graphics and Interactive Tech, 1984. Pages 103-108. ISSN: 0097-8930

Clearly, the final result **is** the accumulated blending of all the images in the stack, where N consists of the number of images, which again appears to be a recitation of an intended property.

Finally, the step of (f) recites the shifting of data from one area of memory (the accumulation buffer) to another (image memory). This could be regarded as differentiating the claims from the prior art, but a look at the seminal paper on the topic (the one that defined it, as cited above) makes clear that the A-buffer is descended from the z-buffer. It was not, and never was intended to be a generalized image memory, in the sense that applicant has defined 'image memory'. Therefore, since prior art clearly teaches that the end result of these combinations is displayed, that requires that the end result be transferred **from** the A-buffer to some other area of memory.

The argument that claims 28 and 29 are duplicates does not stand withdrawn. The claims are not patentably distinct. One claim recites that the weight is on a per-image basis and the other is that the weight is on a per-object basis. While applicant has added 'individually specified' to precede 'image' and 'object' in claims 28 and 29 respectively, a layer or image still can consist of a plurality of objects all assigned the same weight. If each object in a layer or image has a weight that can be individually specified, that means that each object has a weight value. A global setting of a specific weight for the entire image thusly would be propagated to the weight variables in or for each object in the image. Therefore, since applicant did not specify that the individual image(s) and/or object(s) have **different** weights, the claims are not patentably distinct. Therefore, when a weight is set for an individual image, it would be obvious that the

weight could or would be globally assigned to all objects in the aforementioned image. Claims must be interpreted as broadly as reasonably possible during prosecution (see MPEP 2105 and *In re Morris*) that is consistent with the disclosure.

In response to applicant's arguments against the references Morein and Haeberli individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.,* 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, as pointed out in the last Office Action, Morein does teach an accumulation buffer but never expressly states that the accumulation buffer stores data in a RGBA format. The Haeberli reference was added to prove that such buffers store data in such a fashion and that accumulation buffers of that specific type have the advantage of providing improved anti-aliasing. As noted above, Morein strongly suggests that the accumulation buffer therein has such channels but never confirms it; the Haeberli reference was added to show that such configurations have decided advantages.

The MacInnis reference was **only** incorporated to further illustrate the point about per-pixel alpha blending. As for motivation, examiner specifically has pointed to passages in MacInnis (6:30-45, 6:59-7:15, 9:15-25, 13:24-50, etc) that show such techniques provide better anti-aliasing, provide more efficient execution, use less memory, and otherwise reduce memory bandwidth. Haeberli concurs that such configurations (e.g. per pixel weight factor) are more efficient and that when an accumulation buffer is used, that it commonly is known to have these features. Again, examiner points as evidence to the Carpenter paper footnoted above.

Applicant has insisted for the last several actions that Morein did not, per se, teach per-pixel RGBA values. Examiner has repeatedly provided evidence that accumulation buffers **have** such a feature. Examiner now points additionally to the seminal paper that first described the A-buffer (accumulation buffer) for this point. The Haeberli and MacInnis references are used as proof that such techniques are faster and were only incorporated for that point. The noted increases in efficiency and decreases in processing time and memory consumption are more than adequate to justify modifying Morein to utilize per-pixel RGBA values (even though examiner contends that the preponderance of the evidence shows that the state of the art at the time the invention was made (or the Morein reference was invented) was that accumulation buffers utilized RGBA format). Examiner believes that the reasons provided above meet and exceed those set forth in the Federal Circuit's TSM test. Although the reasoning used for combining the above references may be different than applicant's understanding, In re Kahn, 441 F.3d 977, 987, 78 USPQ2d 1329, 1336 (Fed. Cir. 2006)

clearly sets forth that the motivation question arises in the context of the general problem facing the inventor, not any specific situation. Generally, as noted above, the Federal Circuit has held that providing a quantitative improvement in the context of a computer process or a system (e.g. faster execution times, less memory consumption or bandwidth use, and the like) is *prima facie* motivation to combine.

In response to applicant's argument that the examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971). As pointed out above, examiner has extensively documented the state of the art at the time the invention was made. As noted above, the Federal Circuit clearly has held that the **general** problem facing an inventor at the time the invention is made is relevant, not any specific one. Clearly, references such as MacInnis, Haeberli, etc., all use accumulation buffers with alpha values, and provide reasons for doing so that have been designated as *per se* motivations.

Applicant has not cited any particular deficiencies with the Hamburg reference except a generic statement that it does not teach certain limitations. See Remarks page 5 (applicant's number 11) at the bottom of the page, where applicant asserts that the Office has not cited any particular passage of Hamburg to show that particular feature.

The Hamburg reference clearly shows the claimed feature. Examiner did not, at the time, point to a location because it was believed that the Figures and text pointed out previously were sufficient to show that feature. It can be found in Hamburg in for example Figure 9. Each layer is processed in order. Although Hamburg uses composite intermediate layers, the claims do not require that each layer be **separately** composited. Therefore, Hamburg clearly teaches that limitation.

Specifically, the term 'repeating' was used to replace the word 'performing' in step (e). Applicant obviously intended the term to have a different meaning than the previous term 'performing'. The step already recited a process wherein the various steps would be repeated until a threshold criterion was met (e.g. the last image was processed). The addition of the word 'repeating' would seem to indicate that each blending would have to be done twice, an implication for which there is no support or antecedent basis in the specification. Applicant is requested to clarify the import of this term.

Claim Rejections - 35 USC § 101

35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claims 7-10 and 30-31 stand rejected under 35 U.S.C. 101 because they do not recite statutory subject matter. That is, claim 7 does not provide a concrete, tangible, and practical application. The output is not displayed to the user or stored for later display, so there is no physical transformation, or concrete, tangible, and practical application. The claim – as written – is merely manipulating information within a

computer. All the dependent claims of the aforementioned independent claim fail to correct the deficiencies of the parent claim.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> **(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.**

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 7 and 17 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Hamburg (US 6,028,583 A).

As to claims 7 and 17,

A method comprising:

(a) Reading a first stream of image pixels corresponding to an image X_K from an image memory; (Hamburg, Figure 9, layers C to (C+k) constitute images and image pixels. Notably, the image files of the Hamburg system are shown in Figure 7, where each layer contains its own image data 54 as part of layer 52. These clearly constitute an image X_K. See 4:7-22, where clearly this data is stored in some kind of memory,

where that would inherently be image data since an image is stored in it. Also, the various intermediate layers constitute images; data is clearly loaded into the accumulation buffers from an outside source, e.g. the layers and configuration of document 50)

(b) Reading a second stream of pixels corresponding to an image A_K from an accumulation buffer; (Hamburg Figures 9 and 10 specifically, where Figure 10 initializes a set of accumulation buffers to an empty or blank state (step 82) – 4:50-65. Next, clearly an image is put into the primary accumulation buffer (see Figure 10, where if the layer is compound, step 92 "copies the primary buffer into the secondary buffer", or the other alternative, step 86 executes the step "Composite layer with primary buffer", where it is clear that buffer already contains image information of some kind, even if it is only single color information from the initialization step (4:50-65), where the compositing steps are explained in 5:1-6:55. Therefore, clearly the first intermediate image is stored in an accumulation buffer. Hamburg Figures 9 and 10, 4:34-9:10, specifically 4:34-50, "The first intermediate image is stored, e.g. in a volatile or non-volatile memory, to provide a stored intermediate image 72." See also Figure 9, first intermediate layer, consisting of layers 1 to (C-1), where this is stored in the accumulation buffer (prima facie the accumulation buffer is a type of image memory), as discussed in 4:45-5:55, as are all other intermediate images.)

(c) Blending each image pixel of the image X_K with the corresponding pixel of the image A_K based on a programmable scale factor provided for each image pixel, and thus, generating a third stream of output pixels defining an image A_{K+1}; (Hamburg

clearly blends these, where image layers are clearly images – as shown in Figure 7, where an image 54 resides on a layer 42. These are composited, which clearly is a blending operation, where transparency treatment information 58c, image layer global opacity 58a, and the like are present to control the compositing operation for each layer. Each layer or group of layers is merged on a per-pixel basis, where images are made of pixels (1:28-40), where opacity of each layer is clearly considered (1:40-65). The system of Hamburg does so with more granularity, as shown in Figure 2, where transparency information clearly constitutes an alpha value associated with or provided with the image pixel on a particular layer. Clearly the output of this combination is an image – note in Figure 9 that second and third intermediate images are formed. This data is then put back to the primary accumulation buffer. It is noted that even with conventional compositing, wherein a next layer is read and composited with the primary frame buffer, clearly a next layer must be read from some memory location other than the primary accumulation buffer, and then the data from the primary accumulation buffer must be read to perform the blending operation, and then it is written back to the primary accumulation buffer. That is to say, that blending process will always generate a third stream of blended image data)

(d) Transferring the third stream of output pixels to the accumulation buffer to replace the image A_K with the image A_{K+1}; (Hamburg Figure 10, all the intermediate data and the like are stored in accumulation buffers, where clearly this would constitute 'transferring the output pixels to the accumulation buffer,' where all the memory / storage of the image information is accumulation buffers in the system of Hamburg.

Clearly, as explained in the Response to Arguments section, an accumulation buffer has one layer. Therefore, when data is written to it, it overwrites the existing data.)

(e) Repeating (a), (b), (c), and (d) for each image after the first image of a sequence of N images X_K, to provide a final image A_N, wherein image A_N is an accumulated blending of the N images, and wherein $K = 0, 1, 2 \ldots N-1$; and (Hamburg shows that the first and second intermediate images are blended to generate the third intermediate image, and that that third intermediate image is then composited with layers (C+k+1), where each layer is an image, and clearly there is a sequence of images. Clearly the final image is stored in the accumulation buffer. Specifically, note Figure 10 that discusses the process flow. The final data is stored in the primary accumulation buffer (8:53-57))

(f) Storing the final image A_N in the image memory for subsequent display (Hamburg clearly states that 'the contents of the primary buffer may be rendered to display the final image.' (8:53-57). The 'image memory' recited in item (a) can be shown to be the document 50 in Figure 12. That data is transferred from it into the accumulation buffers. Clearly, as noted above, there is an ultimate primary accumulation buffer that the data accumulates in. That information is then transferred for display purposes under that scenario. However, it is noted that the document consists of multiple layers, and is used to 'generate a final image' (2:53). It is further known that the accumulation buffers are instantiated and/or initialized as required)

Specifically, the Hamburg reference fails to expressly teach that the final image is written back to the image memory. However, clearly while the final image **may** be

rendered for display, it may also be stored for later use. It would have been obvious to write the final image back to the data store (image memory) for later use, since it is the desired result of a complex compositing process, and it must be written to another memory location in order to be displayed in any case. One of ordinary skill in the art would find this in the nature of the problem to be solved, see Ruiz v. A.B. Chance Co., 357 F.3d 1270, 69 USPQ2d 1686 (Fed. Cir. 2004).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to write the composited document back to the image memory, since the user initiated the composition process and clearly wanted the end result.

As to claim 17, this is exactly the system used to execute the above. Clearly, Hamburg has an accumulation buffer – Figures 9-11, and it has image memories as recited in the above rejection to claim 17, which is incorporated by reference.

Claims 7 and 17 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Grzeszczuk et al (US 6,667,957 B2).

As to claims 7 and 17,

A method comprising:

(a) Reading a first stream of image pixels corresponding to an image X_K from an image memory; (Grzeszczuk – second texture (texture is inherently an image) from a memory (any memory containing an image or texture is inherently an image memory), where an image inherently consists of pixels and images are sent through the pipeline

in stream fashion; they are not processed entirely in parallel – the system of Grzeszczuk processes them in stream fashion – 19:5-30.)

(b) Reading a second stream of pixels corresponding to an image A_K from an accumulation buffer; (Grzeszczuk clearly reads the first texture, which has been applied to the surface map and the results stored to the accumulation buffer, from the accumulation buffer. 19:5-30)

(c) Blending each image pixel of the image X_K with the corresponding pixel of the image A_K based on a programmable scale factor provided for each image pixel, and thus, generating a third stream of output pixels defining an image A_{K+1}; (Grzeszczuk blends / combines the results of the first texture, which was texture mapped to the surface map and stored to the accumulation buffer, with the second texture – the result of applying texture mapping to the view map, and then combining the results via pixel-by-pixel multiplication (thusly showing the 1:1 correspondence). Next, the results of such a combination are clearly output – 19:5-30, where the combining takes place with respect to alpha values – see 19:40-60 and expressly in 19:5-30, where alpha blending does take place, after the texture blend occurs which will include alpha blending *because the textures are RGBA textures, with an alpha channel; therefore, when they are combined the alpha value will be multiplied and **alpha blending** will take place since the composite texture will consist of elements from each component texture – 19:40-60, where each texture has an alpha channel.)

(d) Transferring the third stream of output pixels to the accumulation buffer to replace the image A_K with the image A_{K+1}; (Grzeszczuk 19:5-30, the results of the above

operation are written back to the accumulation buffer, where this would constitute 'transferring the third stream of output pixels to the accumulation buffer.)

(e) Repeating (a), (b), (c), and (d) for each image after the first image of a sequence of N images X_K, to provide a final image A_N, wherein image A_N is an accumulated blending of the N images, and wherein K = 0, 1, 2, N-1; and (Grzeszczuk clearly teaches that the rendering is performed with respect to time, see 3:20-40 where variable lighting conditions, e.g. lighting that varies with time, is applied, which clearly shows that the rendering acts in stream fashion such that the stream is kept going, where clearly this would constitute a series of images.)

(f) Storing the final image A_N in the image memory for subsequent display. (Grzeszczuk 24:31-35. Clearly, if main memory only holds 'approximate graphical representations, and rendering instructions' and the computer only has one other kind of memory (ROM), the main memory (e.g. image memory) must contain the final image. Additionally, the display device 1021 (24:45-57) must have a separate buffer that the rendered images are sent to.)

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use an accumulation buffer for the texture buffering, since the system of Grzeszczuk can be multi-texturing based, which therefore requires that the resultant textures be accumulated when the are being composited.

As to claim 17, this is exactly the system used to execute the above. Clearly, Grzeszczuk has an accumulation buffer – 19:5-30, and it has image memories as recited in the above rejection to claim 17, which is incorporated by reference.

Claims 8, 18, 22, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grzeszczuk in view of McReynolds ("Advanced Graphics Programming Techniques Using OpenGL," McReynolds et al).

In reference to claims 8 and 18, Grzeszczuk teaches the method of claim 7, but does not explicitly teach the color precision of the accumulation buffer is greater than the color precision of the image buffer. It is well known and obvious, however, to implement a more precise output data calculation in order to avoid losing original data precision and minimize aliasing. An analogous art, McReynolds et al., teaches said limitations.

- McReynolds et al. teaches that 'in order to maintain accuracy over many blending operations, the accumulation buffer has a higher number of bits per color components than a typical color buffer (section 6.4, lines 3-4). Higher number of bits per color components will result in greater color precision for the accumulation buffer.

It would have been obvious to someone of ordinary skill in the art to take the teachings of Grzeszczuk and to add from McReynolds, the method of providing higher color precision of the accumulation buffer than the color precision of the image buffer in order to maintain color precision accuracy over many blending operations. This prevents loss of data and alleviates aliasing problems. It is always important to maintain precise accuracy of data after any data processing.

In reference to claim 22, Grzeszczuk teach the system of claim 17, and Grzeszczuk and McReynolds teach the system of claim 18 above. While Grzeszczuk does not explicitly teach the color precision of the accumulation buffer is at least ΔN larger than the color precision of the image buffer, wherein ΔN is the base two logarithm of the maximum number of images to be blended into the accumulation buffer, McReynolds et al. teaches said limitation in the following in similar fashion as applied to claims 8 and 18 above. That is, McReynolds et al discloses in the definition of "blending with the accumulation buffer" that 'in order to maintain accuracy, the accumulation buffer has a higher number of bits per color components than a typical color buffer (section 6.4, lines 3-4). {'Higher number of bits per color components than a typical color buffer' is interpreting broadly as to include the bit range "*ΔN larger than the color precision of the image buffer.*" The definition of ΔN, base two log of maximum number of images to be blended into the accumulation buffer, is one of design choices resulting in the accumulation buffer having a higher number of bits per color than the image buffer. DN as defined by the applicant has not clear advantages over other design choices, and the specific definition still falls under the range of bit size as disclosed by McReynolds}. It would have been obvious to one of ordinary skill in the art at the time the invention was made, based on the motivation provided by the McReynolds reference above, to modify Grzeszczuk as set forth above, additionally at least for the increase in accuracy so achieved, and the range recited by applicant for the definition of that term falls within the range defined by the McReynolds reference, therefore teaching that limitation.

As to claim 31, while Grzeszczuk does not explicitly teach the color precision of the accumulation buffer is at least ΔN larger than the color precision of the image buffer, wherein ΔN is the base two logarithm of the maximum number of images to be blended into the accumulation buffer, McReynolds et al. teaches said limitation in the following in similar fashion as applied to claims 8 and 18 above. That is, McReynolds et al discloses in the definition of "blending with the accumulation buffer" that 'in order to maintain accuracy, the accumulation buffer has a higher number of bits per color components than a typical color buffer (section 6.4, lines 3-4). {'Higher number of bits per color components than a typical color buffer' is interpreting broadly as to include the bit range "*ΔN larger than the color precision of the image buffer.*" The definition of ΔN, base two log of maximum number of images to be blended into the accumulation buffer, is one of design choices resulting in the accumulation buffer having a higher number of bits per color than the image buffer. DN as defined by the applicant has not clear advantages over other design choices, and the specific definition still falls under the range of bit size as disclosed by McReynolds}. It would have been obvious to one of ordinary skill in the art at the time the invention was made, based on the motivation provided by the McReynolds reference above, to modify Grzeszczuk as set forth above, additionally at least for the increase in accuracy so achieved, and the range recited by applicant for the definition of that term falls within the range defined by the McReynolds reference, therefore teaching that limitation.

Claim 19 is rejected under 35 USC 103(a) as unpatentable over Grzeszczuk in view of Morein (US 6,457,034).

In reference to claim 19, Grzeszczuk teaches the method and system of claim claims 7 and 17 above, but does not expressly teach the plurality of mixing circuits operating in parallel. In addition, remember the delay between accumulation and rendering should be minimized. Since each pixel provides a RGB color component and an alpha value, each of the plurality of accumulators is capable of mixing a corresponding color component. In addition, remember that Morein teaches a first and a second accumulator in order to minimize the delay between accumulation and rendering. Morein also explicitly teaches that if the color data includes multiple color portions, such as red, green, and blue portions, each of these portions will be treated individually by the output block (Col. 6, lines 37-42), and thus it would have been obvious to one of ordinary skill in the art at the time of the invention to take the teachings of Morein and to implement a plurality of mixing units to accumulate individual color components. Since parallel processing is well known and obvious in the ad, it would have been obvious to use a plurality of mixing units to comprise the controller (160) of Morein. Since an accumulator buffer comprises 16 bit to store each red, green, blue, and alpha components, it would be wise to apply a different mixer for each component in order to perform parallel processing and speed up the overall image processing. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Grzeszczuk in light of Morein for at least the reasons

cited above, inclusive of the advantage of minimizing delay and increasing overall processor speed and pipeline throughput.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grzeszczuk in view of Murata and Takeuchi.

In reference to claim 20, Grzeszczuk teach the system of claim 17 above, but does not explicitly teach the accumulation buffer resides within a texture buffer of a graphics system. But, remember that Murata explicitly teaches that a plurality of buffers can reside in one large buffer unit (see Figure 4 as an example, where instead of the plurality of RAMs as in Figure 3, one can be used, as explained in 3:15-45). An analogous art, Takeuchi, explicitly teaches one memory module comprising a plurality of buffers including an accumulation buffer (47) and a texture buffer (48) connected as one unit (FIG. 3). Since the accumulation buffer and the texture buffer are indeed connecting together in the figure, Takeuchi explicitly teaches an accumulation buffer residing within a texture buffer. In addition, in light of the well know and standard memory allocation technique as taught by Murata as ideal (Figure 4, Figure 12, 9:37-65), it would have been obvious to one of ordinary skill in the ad at the time of the invention to take the teachings of Grzeszczuk, and to add from Murata, and Takeuchi the memory allocation technique to combine a plurality of buffers in one large memory module in order to save space and speed up data transfer as applied to claim 21 above. This effectively eliminate the need for extra individual buffers and to expand the capacities of the texture buffer since a texture buffer can include several SDRAMS capable of housing

several types of buffers and memories. Further, having the accumulation buffer reside in the texture buffer will reduce interconnect lengths and thus improve speed and efficiency of the hardware accelerator. That is to say, motivation for one of ordinary skill in the art at the time the invention was made to modify Grzeszczuk would be found in the fact that Murata teaches that having buffers and individual memories within one large memory is more efficient, etc, wherein it provides motivation for combining Takeuchi was Grzeszczuk as set forth above.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Grzeszczuk and further in view of Murata et al. (US 5,621,866)

In regards to claim 21, Grzeszczuk teach the system of claim 17 above, but do not explicitly teach wherein the image buffer resides within the frame buffer of a graphic system. It is, however, well known in the art that frame buffer is a memory module storing image information to be sent to the display device (e.g. Monitor), and it is also well known and standard in the art the a memory module can comprise a plurality of separate memory units. This allows for easy transfer of data from one memory to another, especially any image data from image buffer to frame buffer for the purpose of speedy display of said image data. For example, an analogous art, Murata et al. explicitly teaches that a frame buffer comprises an image buffer and a Z buffer (Col. 1, lines 33-40, Col. 3, lines 4-37 and FIG. 1(A), 3-4). It would have been obvious to one of ordinary skill in the art at the time of the invention to take the teachings of Grzeszczuk, and to add from Murata et al., the combined image and frame buffer since it is well-

known and obvious standard in the art. Having separate buffers in one memory (buffer) module saves space, speeds data transfer and provides overall efficient graphic system. See above discussion in Response to Arguments concerning nature of *prima facie* and *per se* motivation and CAFC precedent.

Claims 25-26, 28-30, and 32 are rejected under 35 U.S. C. 103(a) as obvious over Grzeszczuk in view of Adler et al (US 6,028,907).

As to claim 25, this is essentially the same system as that of claim 17 with additional limitations, the rejection to which is incorporated by reference. Specifically, the mixing unit of the system of claim 17 is comparable to the accumulation unit of claim 25. The limitation of processing N of the images is taught in the third clause. The "2D slice" of the instant claim is comparable to the X_{Kth} image – that is, an image is inherently 2D, and so such a slice would in fact meet that limitation.

Specifically, Grzeszczuk fails to teach and Adler teaches in Figure 2 that a stack of 2D slices from a CT scan (which is known in the art to be generated by incrementally moving a patient through a fixed scanning apparatus to generate a stack of sequential two-dimensional images of a 3D object) can be merged to generate a three-dimensional model of said object. Adler further marks contours on each object (as is apparent in Figure 2)(4:35-55, for example) so that a composite view of the three-dimensional object can be generated and navigated around in three-dimensional space (6:10-16).

Obviously, the system of Grzeszczuk could be used to generate the resultant three-dimensional view, since Adler does not specify that much of the specific graphics subsystem used to calculate such details.

It would be obvious to one of ordinary skill in the art at the time the invention was made to combine the systems of Grzeszczuk with the system of Adler so that a system that could more rapidly render three-dimensional models of bone deformation for scoliosis and the like could be generated and efficiently navigated through by a user.

As to claim 26, Grzeszczuk clearly teach the use of alpha values, and that each pixel has its own alpha value. It would be obvious that if images were being alpha-blended, that each pixel would have its own alpha value, and alpha is inherently a transparency value.

As to claims 28 and 29, since as applicant has pointed out in the Remarks on page 2, alpha is always a positive value, less than or equal to one (inclusive of zero), Grzeszczuk inherently teaches this limitation in that it teaches the use of alpha which has the range as set forth above. One claim recites that the weight is on a per-image basis and the other is that the weight is on a per-object basis. While applicant has added 'individually specified' to precede 'image' and 'object' in claims 28 and 29 respectively, a layer or image still can consist of a plurality of objects all assigned the same weight. If each object in a layer or image has a weight that can be individually specified, that means that each object has a weight value. A global setting of a specific weight for the entire image thusly would be propagated to the weight variables in or for each object in the image. Therefore, since applicant did not specify that the individual

image(s) and/or object(s) have **different** weights, the claims are not patentably distinct. Therefore, when a weight is set for an individual image, it would be obvious that the weight could or would be globally assigned to all objects in the aforementioned image. Claims must be interpreted as broadly as reasonably possible during prosecution (see MPEP 2105 and *In re Morris*) that is consistent with the disclosure.

Claim 29 is not found to be patently distinct from claim 28 and is rejected accordingly. See above discussion in Response to Arguments concerning equivalency. Additionally and Specifically, Grzeszczuk teaches 19:5-20:65 that objects have separate textures applied to them, wherein when such textures are applied they are blended, which requires an alpha weight as set forth above.

As to claims 30 and 32,

Grzeszczuk does not teach that the 2D images are slices of a three-dimensional object.

Specifically, Adler teaches in Figure 2 that a stack of 2D slices from a CT scan (which is known in the art to be generated by incrementally moving a patient through a fixed scanning apparatus to generate a stack of sequential two-dimensional images of a 3D object) can be merged to generate a three-dimensional model of said object. Adler further marks contours on each object (as is apparent in Figure 2)(4:35-55, for example) so that a composite view of the three-dimensional object can be generated and navigated around in three-dimensional space (6:10-16).

Obviously, the system of Grzeszczuk could be used to generate the resultant three-dimensional view, since Adler does not specify that much of the specific graphics subsystem used to calculate such details.

It would be obvious to one of ordinary skill in the art at the time the invention was made to combine the systems of Grzeszczuk with the system of Adler so that a system that could more rapidly render three-dimensional models of bone deformation for scoliosis and the like could be generated and efficiently navigated through by a user.

Claims 27 and 31 are rejected under 35 U.S. C. 103(a) as obvious over Grzeszczuk and Adler as applied to claim 25 above, and further in view of McReynolds. Again, McReynolds is used to explain inherency of the recited limitations as explained below.

That is to say, Grzeszczuk and Adler do not expressly explain the underlying functions of the alpha in blending processes. Therefore, McReynolds is included to elucidate the underlying functionality.

As to claim 27, applicant is trying to claim equation that fundamentally underlies alpha blending. The following blend operation takes place for each color channel. That equation is as follows (see McReynolds page 112, section 10.2, alpha blending, as one of an infinite number of examples of this equation):

$$C_{out} = C_{src} * A_{src} + (1 - A_{src}) * C_{dst}$$

Where C_{out} is the output color to the framer buffer, A_{src} is the alpha value, C_{dst} is the destination color, and C_{src} is the source color, where source color is the color of the

overall scene and the destination color is the color of the object to be added or composited with the overall scene or present image. The equation is well known in the art.

The following equivalencies exist between the variables of the equation of applicant and the variables stated in the alpha blending equation from McReynolds: A_{K+1} is equivalent to C_{out}, alpha is equivalent to A_{src}, X_K is equivalent to C_{src}, and A_K is equivalent to C_{dst}. ($A_{K+1}=C_{out}$, alpha=A_{src}, $X_K=C_{src}$, $A_K=C_{dst}$). Now, applicant's equation will be factored and rearranged as below:

$$A_{K+1} = alpha * (X_K - A_K) + A_K \Rightarrow \quad A_{K+1} = alpha * X_K + (-alpha + 1) * A_K \Rightarrow$$

$$A_{K+1} = alpha * X_K + (1 - alpha) * A_K$$

Compare to alpha blending equation as above: $C_{out} = C_{src} * A_{src} + (1 - A_{src}) * C_{dst}$

They are exactly the same once the mappings specified above are performed. Therefore, since the Grzeszczuk (29:5-30, 29:42-60, etc) reference teaches alpha blending, it inherently teaches this limitation.

Claims 8, 18-19, 22, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hamburg in view of McReynolds ("Advanced Graphics Programming Techniques Using OpenGL," McReynolds et al).

In reference to claims 8 and 18, Hamburg teaches the method of claim 7, but does not explicitly teach the color precision of the accumulation buffer is greater than the color precision of the image buffer. It is well known and obvious, however, to

implement a more precise output data calculation in order to avoid losing original data precision and minimize aliasing. An analogous art, McReynolds et al., teaches said limitations.

- McReynolds et al. teaches that 'in order to maintain accuracy over many blending operations, the accumulation buffer has a higher number of bits per color components than a typical color buffer (section 6.4, lines 3-4). Higher number of bits per color components will result in greater color precision for the accumulation buffer.

It would have been obvious to someone of ordinary skill in the art to take the teachings of Hamburg and to add from McReynolds, the method of providing higher color precision of the accumulation buffer than the color precision of the image buffer in order to maintain color precision accuracy over many blending operations. This prevents loss of data and alleviates aliasing problems. It is always important to maintain precise accuracy of data after any data processing.

In reference to claim 22, Hamburg teaches the system of claim 17, and Hamburg, McReynolds, and Morein teach the system of claim 18 above. While Morein, Haeberli, and MacInnis do not explicitly teach the color precision of the accumulation buffer is at least ΔN larger than the color precision of the image buffer, wherein ΔN is the base two logarithm of the maximum number of images to be blended into the accumulation buffer, McReynolds et al. teaches said limitation in the following in similar fashion as applied to claims 8 and 18 above. That is, McReynolds et al discloses in the definition of "blending with the accumulation buffer" that 'in order to maintain accuracy,

the accumulation buffer has a higher number of bits per color components than a typical color buffer (section 6.4, lines 3-4). {'Higher number of bits per color components than a typical color buffer' is interpreting broadly as to include the bit range "*ΔN larger than the color precision of the image buffer.*" The definition of ΔN, base two log of maximum number of images to be blended into the accumulation buffer, is one of design choices resulting in the accumulation buffer having a higher number of bits per color than the image buffer. DN as defined by the applicant has not clear advantages over other design choices, and the specific definition still falls under the range of bit size as disclosed by McReynolds}.

As to claim 31, while Hamburg does not explicitly teach the color precision of the accumulation buffer is at least ΔN larger than the color precision of the image buffer, wherein ΔN is the base two logarithm of the maximum number of images to be blended into the accumulation buffer, McReynolds et al. teaches said limitation in the following in similar fashion as applied to claims 8 and 18 above. That is, McReynolds et al discloses in the definition of "blending with the accumulation buffer" that 'in order to maintain accuracy, the accumulation buffer has a higher number of bits per color components than a typical color buffer (section 6.4, lines 3-4). {'Higher number of bits per color components than a typical color buffer' is interpreting broadly as to include the bit range "*ΔN larger than the color precision of the image buffer.*" The definition of ΔN, base two log of maximum number of images to be blended into the accumulation buffer, is one of design choices resulting in the accumulation buffer having a higher number of bits per color than the image buffer. DN as defined by the applicant has not clear

advantages over other design choices, and the specific definition still falls under the range of bit size as disclosed by McReynolds}. It would have been obvious to one of ordinary skill in the art at the time the invention was made, based on the motivation provided by the McReynolds reference above, to modify Hamburg as set forth above, additionally at least for the increase in accuracy so achieved, and the range recited by applicant for the definition of that term falls within the range defined by the McReynolds reference, therefore teaching that limitation.

Claim 19 is rejected under 35 USC 103(a) as unpatentable over Hamburg in view Morein.

In reference to claim 19, Hamburg teaches the method and system of claim claims 7 and 17 above. Hamburg fails to expressly teach multiple accumulators operating in parallel. In addition, remember the delay between accumulation and rendering should be minimized. Since each pixel provides a RGB color component and an alpha value, each of the plurality of accumulators is capable of mixing a corresponding color component. In addition, remember that Morein teaches a first and a second accumulator in order to minimize the delay between accumulation and rendering. Morein also explicitly teaches that if the color data includes multiple color portions, such as red, green, and blue portions, each of these portions will be treated individually by the output block (Col. 6, lines 37-42), and thus it would have been obvious to one of ordinary skill in the art at the time of the invention to take the teachings of Morein and to implement a plurality of mixing units to accumulate individual

color components. Since parallel processing is well known and obvious in the ad, it would have been obvious to use a plurality of mixing units to comprise the controller (160) of Morein. Since an accumulator buffer comprises 16 bit to store each red, green, blue, and alpha components, it would be wise to apply a different mixer for each component in order to perform parallel processing and speed up the overall image processing, and one of ordinary skill in the art at the time the invention was made would be motivated to do so for at least the reasons above.

Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamburg as applied to claim 17, and further in view of Murata and Takeuchi.

In reference to claim 20, Hamburg teaches the system of claim 18 above, but do not explicitly teach the accumulation buffer resides within a texture buffer of a graphics system. But, remember that Murata explicitly teaches that a plurality of buffers can reside in one large buffer unit (see Figure 4 as an example, where instead of the plurality of RAMs as in Figure 3, one can be used, as explained in 3:15-45). An analogous art, Takeuchi, explicitly teaches one memory module comprising a plurality of buffers including an accumulation buffer (47) and a texture buffer (48) connected as one unit (FIG. 3). Since the accumulation buffer and the texture buffer are indeed connecting together in the figure, Takeuchi explicitly teaches an accumulation buffer residing within a texture buffer. In addition, in light of the well know and standard memory allocation technique as taught by Murata as ideal (Figure 4, Figure 12, 9:37-65), it would have been obvious to one of ordinary skill in the ad at the time of the invention to take the

teachings of Hamburg and to add from Murata, and Takeuchi the memory allocation technique to combine a plurality of buffers in one large memory module in order to save space and speed up data transfer as applied to claim 21 above. This effectively eliminate the need for extra individual buffers and to expand the capacities of the texture buffer since a texture buffer can include several SDRAMS capable of housing several types of buffers and memories. Further, having the accumulation buffer reside in the texture buffer will reduce interconnect lengths and thus improve speed and efficiency of the hardware accelerator. That is to say, motivation for one of ordinary skill in the art at the time the invention was made to modify Hamburg would be found in the fact that Murata teaches that having buffers and individual memories within one large memory is more efficient, etc, wherein it provides motivation for combining Takeuchi was Grzeszczuk as set forth above.

Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hamburg and further in view of Murata et al. (US 5,621,866)

In regards to claim 21, Hamburg teaches the system of claim 17 above, but do not explicitly teach wherein the image buffer resides within the frame buffer of a graphic system. It is, however, well known in the art that frame buffer is a memory module storing image information to be sent to the display device (e.g. Monitor), and it is also well known and standard in the art the a memory module can comprise a plurality of separate memory units. This allows for easy transfer of data from one memory to another, especially any image data from image buffer to frame buffer for the purpose of

speedy display of said image data. For example, an analogous art, Murata et al. explicitly teaches that a frame buffer comprises an image buffer and a Z buffer (Col. 1, lines 33-40, Col. 3, lines 4-37 and FIG. 1(A), 3-4). It would have been obvious to one of ordinary skill in the art at the time of the invention to take the teachings of Hamburg, and to add from Murata et al., the combined image and frame buffer since it is well-known and obvious standard in the art. Having separate buffers in one memory (buffer) module saves space, speeds data transfer and provides overall efficient graphic system. See above discussion in Response to Arguments concerning nature of *prima facie* and *per se* motivation and CAFC precedent.

Claims 25-26, 28-30, and 32 are rejected under 35 U.S. C. 103(a) as obvious over Hamburg as applied to claim 17, and further in view of Adler et al (US 6,028,907).

As to claim 25, this is essentially the same system as that of claim 17 with additional limitations, the rejection to which is incorporated by reference. Specifically, the mixing unit of the system of claim 17 is comparable to the accumulation unit of claim 25. The limitation of processing N of the images is taught in the third clause. The "2D slice" of the instant claim is comparable to the X_{Kth} image – that is, an image is inherently 2D, and so such a slice would in fact meet that limitation. Also, the weighted value is not specified to be an alpha value, so in theory Morein alone would be sufficient to make the rejection, but the other references are included for the reasons discussed in the Response to Arguments section and the rejection to claim 17 itself.

Specifically, Adler teaches in Figure 2 that a stack of 2D slices from a CT scan (which is known in the art to be generated by incrementally moving a patient through a fixed scanning apparatus to generate a stack of sequential two-dimensional images of a 3D object) can be merged to generate a three-dimensional model of said object. Adler further marks contours on each object (as is apparent in Figure 2)(4:35-55, for example) so that a composite view of the three-dimensional object can be generated and navigated around in three-dimensional space (6:10-16).

Obviously, the system of Hamburg could be used to generate the resultant three-dimensional view, since Adler does not specify that much of the specific graphics subsystem used to calculate such details.

It would be obvious to one of ordinary skill in the art at the time the invention was made to combine the systems of Hamburg with the system of Adler so that a system that could more rapidly render three-dimensional models of bone deformation for scoliosis and the like could be generated and efficiently navigated through by a user.

As to claim 26, Hamburg clearly teach the use of alpha values, and that each pixel has its own alpha value. It would be obvious that if images were being alpha-blended, that each pixel would have its own alpha value, and alpha is inherently a transparency value.

As to claims 28 and 29, since as applicant has pointed out in the Remarks on page 2, alpha is always a positive value, less than or equal to one (inclusive of zero), Hamburg inherently teaches this limitation in that it teaches the use of alpha which has the range as set forth above. One claim recites that the weight is on a per-image basis

and the other is that the weight is on a per-object basis. While applicant has added 'individually specified' to precede 'image' and 'object' in claims 28 and 29 respectively, a layer or image still can consist of a plurality of objects all assigned the same weight. If each object in a layer or image has a weight that can be individually specified, that means that each object has a weight value. A global setting of a specific weight for the entire image thusly would be propagated to the weight variables in or for each object in the image. Therefore, since applicant did not specify that the individual image(s) and/or object(s) have **different** weights, the claims are not patentably distinct. Therefore, when a weight is set for an individual image, it would be obvious that the weight could or would be globally assigned to all objects in the aforementioned image. Claims must be interpreted as broadly as reasonably possible during prosecution (see MPEP 2105 and *In re Morris*) that is consistent with the disclosure.

Claim 29 is not found to be patently distinct from claim 28 and is rejected accordingly. See above discussion in Response to Arguments concerning equivalency. Additionally and Specifically, Hamburg teaches 4:1-22 that objects have separate textures or effects (e.g. alpha based on position) applied to them where such layers consist of objects, wherein when such effects are applied they are blended, which requires an alpha weight as set forth above (5:30-6:65).

As to claims 30 and 32,

Hamburg does not teach that the 2D images are slices of a three-dimensional object.

Specifically, Adler teaches in Figure 2 that a stack of 2D slices from a CT scan (which is known in the art to be generated by incrementally moving a patient through a fixed scanning apparatus to generate a stack of sequential two-dimensional images of a 3D object) can be merged to generate a three-dimensional model of said object. Adler further marks contours on each object (as is apparent in Figure 2)(4:35-55, for example) so that a composite view of the three-dimensional object can be generated and navigated around in three-dimensional space (6:10-16).

Obviously, the system of Hamburg could be used to generate the resultant three-dimensional view, since Adler does not specify that much of the specific graphics subsystem used to calculate such details.

It would be obvious to one of ordinary skill in the art at the time the invention was made to combine the systems of Hamburg with the system of Adler so that a system that could more rapidly render three-dimensional models of bone deformation for scoliosis and the like could be generated and efficiently navigated through by a user.

Claims 27 and 31 are rejected under 35 U.S. C. 103(a) as obvious over Hamburg and Adler as applied to claim 25 above, and further in view of McReynolds. Again, McReynolds is used to elucidate the nature of the alpha function as in and of the recited limitations as explained below.

As to claim 27, applicant is trying to claim equation that fundamentally underlies alpha blending. The following blend operation takes place for each color channel. That

equation is as follows (see McReynolds page 112, section 10.2, alpha blending, as one of an infinite number of examples of this equation):

$$C_{out} = C_{src} * A_{src} + (1 - A_{src}) * C_{dst}$$

Where C_{out} is the output color to the framer buffer, A_{src} is the alpha value, C_{dst} is the destination color, and C_{src} is the source color, where source color is the color of the overall scene and the destination color is the color of the object to be added or composited with the overall scene or present image. The equation is well known in the art.

The following equivalencies exist between the variables of the equation of applicant and the variables stated in the alpha blending equation from McReynolds: A_{K+1} is equivalent to C_{out}, alpha is equivalent to A_{src}, X_K is equivalent to C_{src}, and A_K is equivalent to C_{dst}. ($A_{K+1}=C_{out}$, alpha=A_{src}, $X_K=C_{src}$, $A_K=C_{dst}$). Now, applicant's equation will be factored and rearranged as below:

$$A_{K+1} = alpha * (X_K - A_K) + A_K \Rightarrow \quad A_{K+1} = alpha * X_K + (-alpha + 1) * A_K \Rightarrow$$

$$A_{K+1} = alpha * X_K + (1 - alpha) * A_K$$

Compare to alpha blending equation as above: $C_{out} = C_{src} * A_{src} + (1 - A_{src}) * C_{dst}$

They are exactly the same once the mappings specified above are performed. Therefore, since the Hamburg (29:5-30, 29:42-60, etc) reference teaches alpha blending, it teaches this limitation.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Woods whose telephone number is 571-272-7775. The examiner can normally be reached on M-F 7:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ulka Chauhan can be reached on 571-272-7782. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Eric Woods

February 9, 2007

MICHAEL RAZAVI
[illegible]VISORY PA[illegible]NER
TECHNOLOGY [illegible]